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EXAMINER	
RUTZ, JARED IAN	

ART UNIT	PAPER NUMBER
2187	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/750,455	SWAFFORD ET AL.	
	Examiner	Art Unit	
	Jared I. Rutz	2187	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-7,9-12,14-18,20-29 and 31-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-7,9-12,14-18,20-29 and 31-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1, 2, 4-7, 9-12, 14-18, 20-29, and 31-35, as amended on 6/21/2007, are pending in the instant application. Applicant's arguments have been carefully and fully considered, but are considered moot in light of the new grounds of rejection presented herein. The new grounds of rejection presented in the instant Office action were necessitated by amendment, accordingly this Office action is made **FINAL**.

Specification

2. The amendment to the specification submitted 6/21/2007 incorporates into the detailed description of the Preferred Embodiment a teaching which is supported by originally filed claims 10, 20, and 30, and accordingly does not enter new matter into the specification. Accordingly the amendment to the specification submitted 6/21/2007 is entered.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claims 21-29 and 33** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably

convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

5. **Claim 21** has been amended to recite the limitation "*wherein the timestamp indicates the time of: the requesting of the allocable memory block once the allocable memory block has been allocated; and the freeing of the allocable memory block once the memory block has been freed*". This limitation is not supported by the specification as originally filed. Original claim 10 taught "*wherein the timestamp indicates the time when one of requesting and freeing the allocable memory block is performed*". This teaches that the timestamp may indicate either when the requesting is performed or when the freeing the allocable memory block is performed, as alternatives. The cited limitation requires that the timestamp indicates different things at different times, which is not taught by the specification.

6. **Claims 22-29 and 33** depend from claim 21, and are rejected for the same reasons as claim 21.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

8. **Claims 1-2, 4-7, 9, 11-12, 14-18, and 31-32** are rejected under 35 U.S.C. 102(e) as being anticipated by Abrashkevich et al. (US 7,181,585).

9. **Claim 1** is taught by Abrashkevich as:

a. *A method for providing overwrite detection for an allocable memory block comprising: receiving a request for performing one of requesting the allocable memory block, requesting the size of the allocable memory block, and freeing the allocable memory block.* Column 21 lines 17-20 show that the steps of figure 7 can be performed on basic memory operations such as read, write, and free.

b. *Performing a checksum on the allocable memory block, storing results of the checksum within the allocable memory block.* Column 21 lines 24-27 show that a checksum of allocation data is performed and stored into MDIA attachments to the allocation.

c. *Generating an overwrite detection pattern for the allocable memory block, storing the overwrite detection pattern in the allocable memory block.* Column 21 lines 20-23 shows that during each memory allocation, the eye catcher is stored in the MDIA attachments. Column 19 lines 26-31 shows that the eye catcher is a well known signature stored in a 32 bit location used to verify the memory.

d. *Wherein the overwrite detection pattern is stored separately from the results of the checksum in the allocable memory block.* Column 18 lines 43 through column 19 line 31 show that the checksum is stored in a 64 bit field in the MDIA and the eye catcher is stored in a 32 bit area of the MDIA.

e. *Checking the overwrite detection pattern.* Figure 7 step 202, discussed at column 21 lines 35-37.

f. *And forcing an access violation if one of the checksum is not valid and the overwrite detection pattern has been modified.* Column 21 lines 37-51 show that if the eye catcher is corrupted, an error message is issued or an error recovery protocol is performed.

10. **Claim 2** is taught by Abrashkevich as:

g. *The method of claim 1, further comprising examining the heap to determine whether the overwrite detection pattern has been overwritten.* Column 20 lines 28-31.

11. **Claim 4** is taught by Abrashkevich as:

h. *The method of claim 1, further comprising examining the results of the checksum to determine the presence of memory errors.* Column 21 lines 56-58.

12. **Claim 5** is taught by Abrashkevich as:

i. *The method of claim 1, wherein the overwrite detection pattern is written at the end of the allocable memory block opposite another end of the allocable memory block where the results of the checksum are stored.* Column 17 lines 54-56 shows that a checksum is stored in both the front and back MIDA. Column 19 lines 30-31 show that different signatures may be stored in the front MDIA and

the back MDIA. Figure 6a shows the front MDIA and back MDIA at opposite ends of the allocable memory block. Accordingly, the signature in the front MDIA is stored at an end opposite the end in which the checksum is stored in the back MDIA, and the signature stored in the back MDIA is stored at an end opposite the end in which the checksum is stored in the front MDIA.

13. **Claim 6** is taught by Abrashkevich as:

j. *The method of claim 1, wherein a logical function of the elements within the overwrite detection pattern provides a predetermined result.* Logically ANDing the eye catcher with a 0 will always produce 0, a predetermined result.

14. **Claim 7** is taught by Abrashkevich as:

k. *The method of claim 1, wherein the overwrite detection pattern is written within an area of the allocable memory block that is used for alignment purposes.* Column 10 lines 58-67.

15. **Claim 9** is taught by Abrashkevich as:

l. *The method of claim 1, further comprising storing a heap index for the allocable memory block within the allocable memory block, wherein the heap index points to one of a plurality of heaps.* Column 18 lines 47-65 shows that each MDIA includes a NodeOffset, which contains the offset to a skip list node.

16. **Claim 11** is taught by Abrashkevich as:

m. *A computer storage medium storing computer readable instructions for overwrite detection within an allocable memory block.* Column 3 line 61 through column 4 line 16.

n. *Comprising: a first component that is arranged to receive a request for performing one of requesting the allocable memory block, requesting the size of the allocable memory block, and freeing the allocable memory block.* Column 21 lines 17-20 show that the steps of figure 7 can be performed on basic memory operations such as read, write, and free.

o. *A second component that is arranged to generate an overwrite detection pattern for the allocable memory block.* Column 21 lines 20-23 shows that during each memory allocation, the eye catcher is stored in the MDIA attachments.

p. *Wherein the overwrite detection pattern is written at an end of the allocable memory block opposite another end of the allocable memory block in which a header for the allocable memory block is stored.* Column 19 lines 29-31 show that an eye catcher is stored in both the front and back MDIA. Accordingly, the eye catcher in the back MDIA is at an end opposite the end that the front MDIA, a header, is stored.

q. *A third component that is arranged to store the overwrite detection pattern in the allocable memory block.* Column 21 lines 20-23 shows that during each memory allocation, the eye catcher is stored in the MDIA attachments.

r. *A fourth component that is arranged to generate a checksum on the allocable memory block, a fifth component that is arranged to store results of the checksum in the header of the allocable memory block.* Column 21 lines 24-27 show that a checksum of allocation data is performed and stored into MDIA attachments to the allocation.

s. *And a sixth component that is arranged to store a heap index for the allocable memory block within the allocable memory block, wherein the heap index points to one of a plurality of heaps.* Column 18 lines 47-65 shows that each MDIA includes a NodeOffset, which contains the offset to a skip list node.

17. **Claim 12** is taught by Abrashkevich as:

t. *The computer storage medium of claim 11, further comprising an examination component that is arranged to examine the heap to determine whether the overwrite detection pattern has been overwritten.* Column 20 lines 28-31.

18. **Claim 14** is taught by Abrashkevich as:

u. *The computer storage medium of Claim 13, further comprising a checksum examination component that is arranged to examine results of the checksum to determine the presence of memory errors.* Column 21 lines 56-58.

19. **Claim 15** is taught by Abrashkevich as:

v. *The computer storage medium of claim 11, wherein the overwrite detection pattern is written at an end of the allocable memory block opposite another end of the allocable memory block where the results of the checksum are stored.* Column 17 lines 54-56 shows that a checksum is stored in both the front and back MIDA. Column 19 lines 30-31 show that different signatures may be stored in the front MDIA and the back MDIA. Figure 6a shows the front MDIA and back MDIA at opposite ends of the allocable memory block. Accordingly, the signature in the front MDIA is stored at an end opposite the end in which the checksum is stored in the back MDIA, and the signature stored in the back MDIA is stored at an end opposite the end in which the checksum is stored in the front MDIA.

20. **Claim 16** is taught by Abrashkevich as:

w. *The computer storage medium of claim 11, wherein a logical function of the elements within the overwrite detection pattern provides a predetermined result.* Logically ANDing the eye catcher with a 0 will always produce 0, a predetermined result.

21. **Claim 17** is taught by Abrashkevich as:

x. *The computer storage medium of claim 11, wherein the overwrite detection pattern is written within an area of the allocable memory block that is used for alignment purposes.* Column 10 lines 58-67.

22. **Claim 18** is taught by Abrashkevich as:

y. *The computer storage medium of Claim 11, wherein the overwrite detection pattern is checked and an access violation is forced if the overwrite detection pattern has been modified.* Column 21 lines 37-51 show that if the eye catcher is corrupted, an error message is issued or an error recovery protocol is performed.

23. **Claim 31** is taught by Abrashkevich as:

z. *The method of Claim 1, wherein the overwrite detection pattern is checked when the allocable memory block is passed back to the operating system.* Column 20 lines 56-60.

24. **Claim 32** is taught by Abrashkevich as:

aa. *The computer storage medium of claim 18, wherein the overwrite detection pattern is checked when the allocable memory block is passed back to the operating system.* Column 20 lines 56-60.

Claim Rejections - 35 USC § 103

25. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

26. **Claims 10 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Abrashkevich et al. (cited supra) in view of Gupta (Tasks and Task Management).

27. **Claim 10** is taught by as shown supra with respect to claim 1.

28. Abrashkevich does not expressly disclose the use of a timestamp stored within the allocable memory block.

29. With respect to claim 10, Gupta teaches:

bb. *The method of Claim 1, further comprising storing a timestamp within the allocable memory block, wherein the timestamp indicates the time when requesting the allocable memory block is performed.* Slide 33 on page 17, titled Other Heap Issues, teaches saving information with each block of memory to help characterize memory usage and performance. Lines 10-13 teach the use of a timestamp to see how long a memory block has been allocated.

30. Abrashkevich and Gupta are analogous art because they are from the same field of endeavor, computer memory management.

31. At the time of the invention it would have been obvious to a person of ordinary skill in the art to include a timestamp indicating the time a memory block was requested in the allocated memory block.

32. The motivation for doing so would have been monitor how long a memory block has been allocated, which can identify the presence of possible memory leaks, Gupta page 17 lines 10-16.

33. Therefore, it would have been obvious to combine Gupta with Abrashkevich for the benefit of detecting possible memory leaks to obtain the invention as specified in **claims 10 and 20**.

34. **Claim 20** is taught by Gupta as:

cc. *The computer storage medium of Claim 11, further comprising a timestamp component that is arranged to store a timestamp within the allocable memory block, wherein the timestamp indicates the time when requesting the allocable memory block is performed.* Slide 33 on page 17, titled Other Heap Issues, teaches saving information with each block of memory to help characterize memory usage and performance. Lines 10-13 teach the use of a timestamp to see how long a memory block has been allocated.

35. **Claims 21-29 and 33-35** are rejected under 35 U.S.C. 103(a) as being unpatentable over Abrashkevich et al. (cited supra) in view of Gupta (Tasks and Task Management) and Eigler (Mudflap: Pointer Use Checking for C/C++).

36. The Examiner notes that the rejection of claims 21-29 and 33 under 35 U.S.C. 103(a) are made in light of the 112 first paragraph rejection presented supra.

37. **Claim 21** is taught by Abrashkevich as:

dd. *A system for overwrite detection in an allocable memory block, comprising: a computer memory that comprises a heap in which an allocable memory block can be allocated and freed.* Item 10 of figure 2, discussed at column 4 lines 49-52.

ee. *A memory allocator that is arranged to receive a request for performing one of requesting the allocable memory block, requesting the size of the allocable memory block, and freeing the allocable memory block.* Column 21 lines 17-20 show that the steps of figure 7 can be performed on basic memory operations such as read, write, and free, Column 3 line 61 through column 4 line 4 show that the steps are performed by a memory manager.

ff. *A pattern generator that is arranged to generate an overwrite detection pattern for the allocable memory block.* Column 21 lines 20-23 shows that during each memory allocation, the eye catcher is stored in the MDIA attachments.

38. Abrashkevich does not expressly teach the inclusion of a memory timestamp system.

39. With respect to claim 21, Gupta teaches:

gg. *And a memory timestamp system that is arranged to store a timestamp within the allocable memory block, wherein the timestamp indicates the time of the requesting of the allocable memory block once the allocable memory block has been allocated.* Gupta slide 33 on page 17, titled Other Heap Issues, teaches saving information with each block of memory to help characterize

memory usage and performance. Lines 10-13 teach the use of a timestamp to see how long a memory block has been allocated.

40. Abrashkevich and Gupta are analogous art because they are from the same field of endeavor, computer memory management.

41. At the time of the invention it would have been obvious to a person of ordinary skill in the art to include a timestamp indicating the time a memory block was requested in the allocated memory block.

42. The motivation for doing so would have been monitor how long a memory block has been allocated, which can identify the presence of possible memory leaks, Gupta page 17 lines 10-16.

43. Although Gupta teaches the inclusion of a timestamp indicating the allocation of a memory block, Gupta does not teach that the timestamp can be used to indicate when the memory block was freed.

44. With respect to claim 21, Eigler teaches:

hh. *And the freeing of the allocable memory block once the memory block has been freed.* Page 59, section 2.1 teaches that deallocation timestamps are a prerequisite for evaluating memory accesses, and that the runtime needs to maintain a database including information about each object, which includes a deallocation timestamp.

45. Abrashkevich, Gupta, and Eigler are analogous art because they are from the same field of endeavor, computer memory management.

46. At the time of the invention it would have been obvious to one of ordinary skill in the art to store the deallocation timestamp as taught by Eigler in the memory block as taught by Gupta.

47. The motivation for doing so would have been that the deallocation timestamp is that the deallocation timestamp is useful for evaluating memory accesses, Eigler page 59 section 2.1. As Gupta's inclusion of a timestamp with the memory block provides the necessary structure to maintain the deallocation timestamp, one of ordinary skill in the art would have a reasonable expectation of success storing the deallocation timestamp in the memory block as taught by Gupta.

48. Therefore, it would have been obvious to one of ordinary skill in the art to include a timestamp indicating the time of allocation or deallocation of a memory block in the memory block to obtain the invention as specified in **claims 21-29 and 33-35**.

49. **Claim 22** is taught by Abrashkevich as:

ii. *The system of Claim 21, further comprising a memory verification system that is arranged to examine a heap to determine whether the overwrite detection pattern has been overwritten.* Column 20 lines 28-31.

50. **Claim 23** is taught by Abrashkevich as:

jj. *The system of Claim 21, further comprising a memory verification system that is arranged to perform a checksum on the allocable memory block and storing the results of the checksum within the allocable memory block.* Column

21 lines 24-27 show that a checksum of allocation data is performed and stored into MDIA attachments to the allocation.

51. **Claim 24** is taught by Abrashkevich as:

kk. *The system of claim 23, further comprising a memory verification system that is arranged to examine the results of the checksum to determine the presence of memory errors.* Column 21 lines 56-58.

52. **Claim 25** is taught by Abrashkevich as:

ll. *The system of Claim 21, wherein the overwrite detection pattern is written at an end of the allocable memory block opposite another end of the allocable memory block where the results of the checksum are stored.* Column 17 lines 54-56 shows that a checksum is stored in both the front and back MIDA. Column 19 lines 30-31 show that different signatures may be stored in the front MDIA and the back MDIA. Figure 6a shows the front MDIA and back MDIA at opposite ends of the allocable memory block. Accordingly, the signature in the front MDIA is stored at an end opposite the end in which the checksum is stored in the back MDIA, and the signature stored in the back MDIA is stored at an end opposite the end in which the checksum is stored in the front MDIA.

53. **Claim 26** is taught by Abrashkevich as:

mm. *The system of Claim 21, wherein a logical function of the elements within the overwrite detection pattern provides a predetermined result.* Logically ANDing the eye catcher with a 0 will always produce 0, a predetermined result.

54. **Claim 27** is taught by Abrashkevich as:

nn. *The system of Claim 21, wherein the memory overwrite detection pattern is written within an area of the allocable memory block that is used for alignment purposes.* Column 10 lines 58-67.

55. **Claim 28** is taught by Abrashkevich as:

oo. *The system of claim 21, wherein the overwrite detection pattern is checked and an access violation is forced if the overwrite detection pattern has been modified.* Column 21 lines 37-51 show that if the eye catcher is corrupted, an error message is issued or an error recovery protocol is performed.

56. **Claim 29** is taught by Abrashkevich as:

pp. *The system of Claim 21, further comprising a memory indexing system that is arranged to store a heap index for the allocable memory block within the allocable memory block, wherein the heap index points to one of a plurality of heaps.* Column 18 lines 47-65 shows that each MDIA includes a NodeOffset, which contains the offset to a skip list node.

57. **Claim 33** is taught by Abrashkevich as:

qq. *The system of claim 28, wherein the overwrite detection pattern is checked when the allocable memory block is passed back to the operating system.* Column 20 lines 56-60.

58. **Claim 34** is taught by Eigler as:

rr. *The method of Claim 1, further comprising storing a timestamp within the allocable memory block, wherein the timestamp indicates the time when freeing the allocable memory block is performed.* Page 59, section 2.1 teaches that deallocation timestamps are a prerequisite for evaluating memory accesses, and that the runtime needs to maintain a database including information about each object, which includes a deallocation timestamp.

59. **Claim 35** is taught by Eigler as:

ss. *The computer storage medium of Claim 11, further comprising a timestamp component that is arranged to store a timestamp within the allocable memory block, wherein the timestamp indicates the time when freeing the allocable memory block is performed.* Page 59, section 2.1 teaches that deallocation timestamps are a prerequisite for evaluating memory accesses, and that the runtime needs to maintain a database including information about each object, which includes a deallocation timestamp.

Conclusion

60. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jared I. Rutz whose telephone number is (571) 272-5535. The examiner can normally be reached on M-F 8:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jared I Rutz
Examiner
Art Unit 2187

jir

Brian R. Peugh
Primary Examiner